Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended and new claims added to more clearly claim Applicants invention. Support for the amended and newly drafted claims are found in the original claims and/or the Specification. No new matter has been added. For example, support for new limitations included in claims 1, 9 and 17, as well as claims 2, 5 are found in Figure 3 and in the Specification at page 12, beginning at line 4:

"The present invention is generally directed to a primer tank having a nozzle assembly which uniformly disperses nitrogen or other vapor-generating gas in multiple gas streams of relatively low energy against a primer liquid in the tank to generate a primer vapor for the priming of a semiconductor wafer substrate. The nozzle assembly may include a conduit to which is confluently attached a nozzle head having a nozzle plate. Multiple nozzle openings are provided in the nozzle plate in a selected pattern to substantially uniformly distribute multiple streams of nitrogen or other inert gas against the surface of the primer liquid to generate a primer vapor from the primer liquid. The dispersed flow of the nitrogen or other gas reduces the energy of impact between each gas stream and the liquid primer, thereby eliminating or at least substantially reducing the formation of primer droplets which would otherwise be drawn from the tank into the oven or chamber in which the primer is applied to the substrate."

and at page 16 beginning at line 11:

"Accordingly, each of the multiple secondary gas streams 72a strikes the liquid primer 42 at a substantially reduced gas pressure of typically about 0.75 Kpa. This optimizes generation of primer vapor 60 in the tank body 41 while preventing or substantially reducing the formation of liquid primer droplets which would otherwise be drawn with the primer vapor 60 into the process chamber 64 through the vapor outlet tube 70 and contaminate the wafer substrate 66 therein."

Support for claim 19 and new claims 23 and 24 are found in the Specification at page 15 beginning at line 5:

"The pressure of the gas in the primary gas stream 72 is typically about 50 Kpa. The secondary gas streams 72a strike the surface of the liquid primer 42 in a dispersed pattern. Accordingly, upon striking the liquid primer 42, the secondary gas streams 72a generate a substantially droplet-free primer vapor 60 in the tank body 41 of the primer tank 40. Because the interior of the process chamber 64 is maintained at a reduced pressure, the primer vapor 60 is drawn from the tank body 41 through the vapor outlet tube 70 and into the process chamber 64, where the primer vapor 60 forms a primer layer 62 on the substrate 66."

Claim Rejections under 35 USC 102(b)/103(a)

1. Claims 1-18, and 20 stand rejected under 35 USC 102(b) as being anticipated by or, in the alternative, under 35 USC 103(a) as being unpatentable over Fukada (US 5,733,375).

Fukada discloses an HDMS vaporizer having several embodiments; several embodiments include a **gas bubbler** disposed at a bottom portion of a liquid holding tank submerged in the liquid (e.g., Figures 1, 3, 5, item 4). In addition, Fukada discloses an embodiment without a gas bubbler where a single gas stream impacts a liquid surface; having a configuration similar to that disclosed by Applicants as prior art (see Fukada Figure 6, Applicants Figure 1). In the embodiment of Fukada without the gas bubbler, the gas stream for vaporizing the liquid for impacting the liquid surface is supplied through **a pipe** at the upper portion of the tank **to produce a single gas stream** (see col 8, lines 18-20, lines 27-30; Figure 6).

Fukada fails to disclose several elements of Applicants disclosed and claimed invention **including Applicants claimed nozzle assembly** in claims 1 and 9 as well as Applicants claimed method in claim 17 including "**impacting an inert gas comprising a plurality of gas streams** onto said exposed surface to form a vapor above said liquid vapor interface"

Thus, Fukada is clearly insufficient to anticipate Applicants disclosed and claimed invention.

Fukada is further insufficient make out a *prima facie* case of obviousness with respect to Applicants disclosed and claimed invention. Nowhere does Fukada disclose or suggest impacting the liquid surface **with a plurality of gas streams** onto the liquid surface to form a vapor. Rather, the apparatus and methods of Fukada including a gas bubbler work by a different principal of operation than Applicants disclosed and claimed invention or disclose a similar embodiment as in Applicants prior art presenting the very problem that Applicant disclosed and claimed invention overcomes. Moreover, Fukada does not recognize the problem, or suggest an apparatus to overcome the problem that Applicants disclosed and claimed invention recognizes and solves: "A primer tank for generating a primer vapor with reduced primer droplet formation"

2. Claims 1-18, and 20 stand rejected under 35 USC 103(a) as being unpatentable over Fukada (US 5,733,375), in view of Yamaguchi (US 5,803,938), Martin (US 3,608,280), and Mikoshiba (US 5,755,885).

Applicants reiterate the comments made above with respect to Fukada.

Yamaguchi discloses a **bubbling tube** submerged in a liquid, and in one embodiment, **a diffusion plate over the bubbling tube** (Figures 18 and 19, col 27, line 44 to col 28, line 23).

Martin discloses **a series of diffusion plates for bubbling air through liquid** in what appears to be an air cleaning system (see e.g., Figure 2).

Mikoshiba, likewise discloses **gas feed pipes** for placement within (submerged in) an organometallic liquid to create gas bubbles within the liquid (col 6, lines 21-35) or alternatively, a **gas feed pipe** with a plurality of small openings on the pipe (col 6, lines 58-61) **for ejecting gas into the liquid** and forming gas bubbles within the liquid.

Assuming *arguendo* a proper motivation for combining Fukada with any or all of Yamaguchi, Martin, and Mikoshiba, which Applicants do not concede, such combination does not produce Applicants disclosed and claimed invention.

Fukada, Yamaguchi, Martin, and Mikoshiba all disclose **gas bubblers for forming gas bubbles within a liquid**, similar to embodiments disclosed by Fukada (e.g., Figures 1, 3, 5, item 4).

The **gas bubblers** of Fukada, Yamaguchi, Martin, and Mikoshiba operate by a different principal of operation than Applicants disclosed and claimed invention, as well as the embodiment of Fukada's of directly impacting the liquid surface with a single stream of gas. That is, with gas bubblers, vaporization occurs by vaporization into the gas bubble as it rises through the liquid, thus depending on a variety of different factor such as residence time of the bubbles etc., rather than upon gas stream impact on the surface of a liquid to effectuate evaporation as in Applicants disclosed and claimed invention.

Fukada, in combination with any or all of Yamaguchi, Martin, and Mikoshiba, is insufficient to make out a *prima facie* case of obviousness with respect to Applicants disclosed and claimed invention.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." *In re Ratti, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).*

"The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

3. Claims 17-18, and 20 stand rejected under 35 USC 103(a) as being unpatentable over Fukada (US 5,733,375), in view of Matsuka (US 5,520,857), further in view of Palmer (US 4,768,291) and Schmohl (2004/0146649).

Applicants reiterate the comments made above with respect to Fukada.

Matsuka teaches an evaporator including a sealed container where carrier gas is fed into the sealed container and includes a **carrier gas blower that directs the carrier gas radially and/or upwardly to contact the upper internal surface of the sealed container** (see abstract; Figures 3, 5, 8, 11, 12, and 13; col 5, lines 58-60; col 4, lines 3-10; col 4, lines 44-52; col 5, lines 22-24).

Matsuka does not disclose or teach "impacting an inert gas comprising a plurality of gas streams onto said exposed surface to form a vapor above said liquid vapor interface, said vapor comprising said liquid primer and said inert gas" as Applicants have disclosed and claimed.

Rather Matsuka **teaches away from directly impacting a carrier gas on the liquid surface** (see Figure 4; col 4, lines 58-

63), which includes an aspect of Applicants disclosed and claimed invention. It is noted that Applicants also discuss and disclose the prior art present by Matsuka in Figure 4, and problems presented thereby including droplet formation, which Applicants disclosed and claimed invention overcomes. Thus the invention of Matsuka addresses a problem similar to one solved by Applicants disclosed and claimed invention, but in a different manner, and which operates by a different principal of operation, i.e., **avoiding direct impact of a gas stream onto the liquid surface.**

Assuming *arguendo*, a proper motive for combining the teachings of Matsuka with Fukada, and with Palmer and Schmohl, such combination does not produce Applicants disclosed and claimed invention. The fact that Palmer discloses that HDMS is known to be flammable and that Schmohl discloses that HDMS is known to have a high vapor pressure does not help Examiner in establishing a *prima facie* case of obviousness with respect to Applicants disclosed and claimed invention.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." *In re Ratti, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).*

"We do not pick and choose among the individual elements of assorted prior art references to recreate the claimed invention, but rather we look for some teaching or suggestion in the references to support their use in a particular claimed combination" *Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 1569, 19 USPQ2d 1241 (Fed. Cir. 1991).*

4. Claims 17-18 and 20 stand rejected under 35 USC 103(a) as being unpatentable over Applicants description of the prior art in view of Matsuka (US 5,520,857).

Applicants reiterate the discussion with respect to Matsuka where it was noted that Matsuka **teaches away** from an embodiment including impacting a single stream of carrier gas on a liquid surface (see Figure 4; col 4, lines 58-63), an embodiment also disclosed in Applicants discussion of the prior art including problems presented thereby, which Applicants disclosed and claimed invention overcomes.

Assuming *arguendo* proper motivation for combining Applicants discussion of the prior art with Matsuka, which Applicants do not concede, does not produce Applicants disclosed and claimed invention. Combination of Applicants discussion of the prior art and problems presented thereby with Matsuka, where similar problems are disclosed including a teaching away from such impact

of a gas stream onto a liquid surface, does not help Examiner in establishing a *prima facie* case of obviousness with respect to Applicants disclosed and claimed invention.

"The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

"A prior art reference must be considered in its entirety, i.e., as a whole including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc., Garlock, Inc., 721 F.2d, 1540, 220 USPQ 303 (Fed Cir. 1983), cert denied, 469 U.S. 851 (1984).*

5. Claims 19 stands rejected under 35 USC 103(a) as being unpatentable over Applicants description of the prior art in view of Matsuka (US 5,520,857), and further in view of Palmer (US 4,768,291) and Mellet (US 4,704,988).

Applicants reiterate the comments made above with respect to Applicants description of the prior art in view of Matsuka.

The fact that Mellet discloses relevant operating pressures for an apparatus that works by a different principal of operation i.e., evaporating by heating the liquid (see abstract) does not help Examiner further in establishing a *prima facie* case of obviousness.

The Claims have been amended to clarify Applicants' disclosed and claimed invention. A favorable reconsideration of Applicants' claims is respectfully requested.

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

Tung & Associates

Randy W. Tung
Reg. No. 31,311
Telephone: (248) 540-4040